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Monster on the beach
on U-Cay, Allan's Cays,
Cyclura cyclura inornata.
Photograph: Paul Wright

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PSYCHOSOCIALIZATION OF THE GREEN IGUANA: HOW TO BETTER HANDLE YOUR PET

MELISSA KAPLAN

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An animal kept in captivity who is never reconciled to its condition lives in a continual state of stress. An iguana who is never tamed and socialized becomes stressed each time it sees or is forced into contact with the main object of stress—humans.

An untamed iguana is no fun to interact with and a vicious cycle is established, with the iguana running away and scratching, lashing and even nipping or biting whenever it is caught. As most owners of untame iguanas cannot hold onto them long enough to trim their nails, they either stop trying to hold the iguana or resort to using enormous, or enormously thick, gloves which not only scares the iguana even more, but can cause injury as they are often too thick to be able to accurately gauge the pressure being put on iguana bones. When the iguana has a calcium deficiency, broken bones are all too common. As most vets prescribe complete inactivity and the removal of all cage furnishings during the recovery period, an already barely tamed iguana becomes totally wild and takes longer to heal due to the lack of weight-bearing activity.

Most of the calls I get, and house calls I make, are related to untamed iguanas. Most of the iguanas I am given are wild; at best, they are barely tolerant of very short episodes of human contact. The reason most often cited for getting rid of iguanas two or more years of age is that they are difficult or “impossible” to deal with or the owners start to feel guilty for leaving it locked in a cage day after day while it glares out at them every time they walk by.

It is not an impossible task to tame and socialize iguanas. It does take time, it will involve the loss of some skin (yours) and some sleepless nights (yours) and some occasional despairing thoughts (yours). On the flip side, there will be increased mental and physical health (yours and

the iguana’s), increased interest in its surroundings (the iguana’s), and an opportunity to teach your children and others how to interact and get to know another living creature.

Iguana Psych 101

The Pavlovian Training of Humans

In the wild, iguanas are somewhat social animals. They are found in groups in trees, basking and foraging together. Amongst herbivores there is little competition for food when food is plentiful. And as long as there remains forest, there is plenty of food for the iguanas living in the trees. There is, however, competition for prime basking areas and, during different seasons, competition for seasonally available fruits and flowers, and for territory and females during the breeding season. Males are the most competitive, with adult males vying for the alpha position—the best basking perch, the biggest territory, the most females. Females are only occasionally territorial, primarily reacting offensively when they wish to be left alone. Young males who are not yet ready to take on mature males may hang out with dominant males, but are always watchful for signs of aggression. When the dominant male begins territorial and attractant behaviors, most younger males take off for the periphery, avoiding as much as possible the attentions of the dominant males. Young males who have reached sexual maturity but who are not yet able to compete successfully against a bigger male often do not adopt breeding colors, retaining instead their juvenile colors which are essentially those of the females, a survival tactic found in many different species throughout the animal kingdom.

In captivity, the owner and owner’s family are first considered potential predators, later being transforming into competition as the iguana becomes assured that it is not going to be eaten.



Sub-adult green iguana, *Iguana iguana*. Photograph: R.W. Ehrig

When you first bring your iguana home, it reacts like most other small animals who find themselves temporarily at the bottom of the food chain: thrashing, puffing up, lashing its tail, opening its mouth so you can see how pink and dangerous it is and, when that doesn't work, it attempts to run away. When you do manage to pick it up, it whips its tail, scratches, crocodile rolls - in short doing everything possible to get away from you. When it does get away or when you give up trying to get it out of its enclosure, you have taught the iguana that it can make you go away. The next time you go to get it out, it will act up again, often more vigorously than it did before. When you go away yet again or put it down as soon as you get scratched or bit, you will have once again reinforced that behavior.

(Note: if your new iguana does not act like this but lays placidly in its enclosure and barely objects when you pick it up, you have not lucked out by managing to select an already tame iguana. What you have is a sick iguana. Get it to an experienced reptile veterinarian as quickly as possible; if you can, take a fresh fecal sample with you.)

It is at this point that most owners make their biggest mistake. They decide to wait until the iguana calms down; some owners believe that

once the iguana settles in or gets a little older, it will be tame. Not! What they do get is a 5 foot, 10 pound iguana who is just as wild and crazy as when they bought it, only now when it doesn't nip, it bites with a set of very powerful jaws and the whippy tail becomes an armored razor-edged lash. It becomes a frightening prospect to remember that the iguana is still not full-grown.

Some owners or primary caretakers are able to develop a relationship with their iguana, but the rest of the household gets subjected to the same wild behavior. What happens in this situation is that the owner or primary caretaker has not put up with the wild behavior and so has been established as the alpha entity. The iguana then tries and usually succeeds in dominating everyone else. Some owners and families are able to tame their iguana so that it is well behaved with the immediate family but when any outsider to that family unit comes in, even friends of family members who visit frequently, the iguana acts to dominate them.

Tricks

Iguanas threaten by using a variety of physical behaviors. When not being held, they stand tall with all four limbs extended; they laterally

compress their body to make themselves look even taller; the dewlap swings out to full extension to increase the silhouette-size of their head; the tail twitches and lashes; the open mouth threatens to bite; and “push ups” and bobbing forequarters warn of impending movement. The body is broadside to you to reinforce the illusion of size. When you reach in to pick it up, it may continue to present, may hiss or click-hiss with open mouth, and whip its tail; it is at this point that most people give up.

When held, the iguana may claw with all feet, trying to climb out of your grasp, whip your arm or face with its tail while it rolls around inside your grip (“crocodile rolls”) in the attempt to wriggle free. Open mouth hissing and click-hissing and nipping complete the threatening behavior. Many determinedly untame iguanas become quite adept at snaking their necks around to deliver a painful bite.

These are the behaviors you must not walk away from. When you are holding the iguana in your hands, you should not put it down when they occur, even if you are getting bit and scratched. Sounds easy, but it takes some nerve, patience and perseverance on your part...and a willingness to lose some skin. And blood! (Note: try not to jerk your hand away when you get bit - this will actually make the injury worse than it might otherwise have been.

You can trim their claws before you get into heavy training sessions...of course, you have to get enough control over each toe to hold it still enough to cut off just the tip of the claw...without taking off the entire toe! Used the stubby claw nippers with the half-circles cut out of each “blade” and have an open container of blood stop powder—and a handler—close at hand.

Tips and Techniques

When you reach in to get the iguana out of its enclosure, make sure you are well balanced; it won't do either of you any good if you lose your balance just as you grab the iguana, dropping it before you crash to the floor dragging the Vitalite with you. If the iguana continues to elude you, dodging between the basking branches and hide

box and water bowl, remove as many furnishings as you need to be able to have a clean shot at him, and take away any places he can hide behind. Don't give up. If it is taking longer than you thought it would and you are getting to (or past) the point where you just don't care any more, don't give up! If you do, the iguana will have won that encounter. You will have reinforced the fact that it can indeed make you go away.

If the iguana has gotten out of its enclosure (a polite way of saying that when you finally got him out, you let him get away from you!) and is running around the room or the house, you must get it. It may mean crashing and banging into furniture (you more than the iguana), intruding yourself into that small, dusty place beneath the dresser or behind the bookcase and rearranging the furniture as you move it all to try to get to him, but do it you must.

Once you are finally able to pick him up, hold him for at least a couple of minutes. It must be your decision to put him down, not his. If he gets particularly wild, if he scratches, lashes or bites you, do not put him down. If you do, you will have reinforced the concept that scratching, lashing and biting works. It's pure cause and effect, a concept the iguana can easily understand: he hurts you, you put him down. Yes, you are playing a game of wits and nerves with a little green lizard. It may sound stupid, but it is surprising how many people lose this game!

Let him climb from hand to hand and roll freely within your hands. Talk gently to him, using his name often. Rock back and forth with him. Try holding him in your hand and extending your arm upright over your head. The iguana should settle down and stop writhing around. After a moment or two of calm, slowly bring him down to your eye level. Support his body in both your hands, thumbs under the belly/chest area, his hind legs resting on your forearms, your fingers arched over his back, his face within a few inches of yours. Continue talking softly, using his name. At this point the iguana should settle down for a few moments. The more often you do this, the less preamble (fighting, lifting) you will have to go through and you will both experience longer

periods of calm. The iguana will learn that you won't put it down until it calms down, resulting in an iguana who settles down sooner each time.

Expect regression. You may have gone to bed one night ecstatic about the progress you two have made only to find your iguana's evil twin has moved in over night. Just keep at it. Remember that you are bigger and smarter. Or are supposed to be. Frequently remind yourself of these facts.

Integrating Iguanas Into Your Life

Iguanas are alert, curious and interested in their surroundings, eager to explore new spaces and find great places to bask, sleep and, at least initially, hide. One of the fastest ways to tame your iguana, and the best way to ensure a mentally healthy iguana, is to give it as much time out of its enclosure as you can.

Out time requires a bit of preparation. As with a young child, you must iguana-proof the room or rooms the iguana is going to be allowed access to. This means a bit of time on your back and knees, roll of duct tape in hand, covering up holes and openings under and inside cabinets in the bathroom and kitchen, under appliances, between appliances and cabinets. Assure that all window and door screens are free of rips and holes and are securely fitted. Remove all toxic houseplants.

Three pieces of equipment I find indispensable are a hand mirror, long stick (I use my 5' hickory walking stick or 6' snake hook) and a powerful flashlight. The mirror enables me to look under and behind things without having to get down on the floor; the flashlight is useful when those places are dark (which they usually are!). The stick enables me to encourage a reluctant iguana to come out from behind the bookcase or from smack in the middle of the floor under my king-size bed. (Someone also recommended keeping two strong men armed with screwdrivers around to disassemble the furniture, but these items are more difficult to store when not in use!)

Make sure that the room you are letting the iguana out into is warm enough. It is not necessary to keep the room at 95°F, but you do need to provide a basking area, preferably one several feet (5-6') up above the floor where the iguana can

look out the window. You can make an easy climber for the iguana by wrapping a board in sisal rope or a towel and bracing it against the shelf of the basking area (securely fastened towels, bird ladders and double layers of fish netting also work well).

Show your iguana around the house. Show him where his water and food are, and where the basking area is. They may not remember the first time out, but iguanas do have good memories for interesting things like basking and hiding areas and will eventually settle on two or three favorite places. You may wish to keep the toilet and any closets and boxes you do not want the iguana exploring closed; one of my iguanas has a favorite spot when he wants to be alone - the second shelf of the towel stand over the toilet in my guest bathroom; another prefers the bathtub in my bathroom.

Include your iguana into your daily routine. A plastic hook stuck on the tile wall of your shower with a washcloth securely hanging from it makes a nice place for your baby ig to hang out while you shower. A shoulder is a comfortable perch while you are eating meals, paying bills, working on the computer, doing your homework. Hold your iguana and let it sit with you or explore the couch or chair while you talk on the phone or watch TV.

Expect it to get "lost." As long as it is healthy and nighttime temperatures are within the lower limits of the iguana's required gradient, it will not be the end of the world if it spends the night out of its enclosure. As mentioned above, they begin to frequent the same places over and over again and eventually all you need to do is make the rounds of their favorite spots to make sure they are there and comfortable. Well, safe. I've seen some scrunched up in some pretty funny positions all in the attempt to make themselves invisible.

Taking It to the Streets

Early on you should begin getting you and your iguana used to being outside. This does not mean you stick your iguana on a bush and walk away. Nor does it mean that you pop a leash around its neck and go walking down the street.

It does mean that as you begin to build up trust with your iguana inside the house, you need to begin building up the same trust outside. But, while inside the house you do not have to constantly have your hand on the iguana, outside you need to be in constant contact with the iguana to safeguard against its jumping and taking off.

I do not recommend the use of leashes, especially the so-called "iguana" leashes that are merely ferret and rabbit leashes repackaged with a picture of an iguana. If a collar/leash is on loose enough so that it does not hurt the iguana, it is loose enough so that the iguana can rapidly dorsally and laterally compress itself and wriggle out. If it is on tight enough so that the iguana cannot get out, then it is too tight, and you risk strangling your iguana should he leap off. You will also destroy the dorsal spikes in the area immediately beneath and on either side of the leash. There are new harnesses out now, with a sling-like piece which goes under the iguana's chest and through which his forearms are placed. The same problems occur with this harness as with the figure-eight, except that if the harness is loose enough to not injure the spines, it is on loose enough for the sling to slip and a thrashing iguana to break a leg.

Get the iguana used to the presence and touch of other people, noise and movement. You will eventually find places that welcome you and your iguana, and places that do not. Respect those who do not. Respect local health codes and the owners of restaurants and markets and do not take your iguana inside. Pet stores and nature stores are often great places to introduce your iguana to new people and to do a little educating on your own.

In Conclusion

Take the time to do it right. Be patient. Just as you spent a great deal of money and time setting up the iguana's tank and strive to provide it with the proper environment and diet, use the same patience to work with your iguana. It will take anywhere from 6-8 months (or longer, depending upon the individual's temperament) to reach the point where your iguana is comfortable in most situations. That is a short period of time, indeed,


when weighed against the potential lifespan of 20+ years.

Be sure to play with the tail when they are young and as they grow. Get them used to it being touched and gently tugged. An iguana who is not freaked when his tail is grabbed is an iguana who is not going to lose it when some untamed little child comes up and yanks on the iguana's tail to get your attention. When you go to grab your ig, place one hand under the pelvis/base of tail area, then slip the other hand under the chest, and scoop it up. This will enable you to pull it out or up out of harms way and lets you swing him easily into a forearm carry (the ig's belly resting on your forearm, legs dangling over each side of your arm, your fore- and middle fingers cradling the neck, tail between your arm and ribs).

Most young children (and this includes many kids up into their early 'teens) do not like being scratched and are generally not the ones who should be primarily responsible for the ig's taming and socializing. Taming iguanas should be a family effort as all members of the family ultimately will be sharing their living space with a strong-willed lizard the size of a medium, albeit low-slung, dog.

Taming older iguanas is not necessarily more difficult than working with youngsters, but some may never become as fully tame—comfortable and secure in all interactions—as do ones tamed early on. But it can be done and there is no reason not to start now to retrain yourself and your iguana.

Iguanas have very individualized personalities, each with their own likes and dislikes. Part of the taming process is to learn what your iguana likes and doesn't like and, as much as possible without compromising the taming and socialization, respect those needs and likes. Though the training and taming time are intense, the rewards great for both you and your iguana.

Excerpted with permission from the book Green Iguana Care, Feeding and Socialization, by Melissa Kaplan, published 1995 on the Internet (<http://www.sonoma.edu/education/melissa/ig-care2.htm>). This chapter is currently under revision. 

GREEN IGUANAS ARE SOCIAL BEINGS

WENDY TOWNSEND

The green iguana is a marvelous being. He is a reptile; a lizard, and a wild animal. He looks something like a dinosaur. He has elaborate head gear: ornamental scales, a flag of skin at his throat, and a crest of spines that runs from neck to tail. As a hatchling he is bright green. With maturity, dark bands may appear on his body, and his colors may change to darker green, olive, orange, blue, or a combination of these. He will grow from 12-18 inches (30-46 cm), excluding his long tail, in 2-3 years. His size, beauty, and gentle nature make him wonderful to hold. *Iguana iguana*

is one of the most popular pets today. With his exotic, vital presence, he brings a bit of his home, the tropical rain forest, into ours. And he is a memento of a shrinking wilderness.

"During 1992, more than 300,000 live green iguanas were items of commerce."¹ By 1995, that number had more than doubled: "With imports to the US exceeding 700,000 per year, the pressure on wild populations has become an issue of concern. Furthermore, a high percentage of these lizards are believed to die within the first year."²

How sad, and surprising for such a fascinating, popular animal. And how unfortunate for the many people whose new pet iguanas die. Why, beyond his appearance and good nature, has the iguana become so popular in recent years? We have separated ourselves from all but the most domesticated creatures, and as we grow more distant from nature, we look for more vestiges of it. Though he will be a pet, the iguana remains a wild animal; a link to the natural world. For a lot of people, especially children, a rapport with a wild animal is a thing that is wished for, even craved. Many of us find a connection to nature in the pet iguana, while others purchase iguanas, but do not

build a rapport enabling that connection to exist. In the latter case, the keeper may not understand why the pet iguana became a disappointment. With several fine care books, reptile husbandry magazines, and green iguana care videos available, these lizards are still not understood. Iguana husbandry isn't difficult. But knowing about practical care is only part of keeping iguanas. We have much to discover about "who" they are. We must look at our iguanas, as well as the books.

Gordon Burghardt
Iguanas of the World

A good place to start in looking at iguanas is to value them, and what they can teach us about life other than human. Because iguanas are "cold-blooded", or ectothermic (relying on their environment for body temperature), a lot of human beings assume a cold-dumbness about them. A surprising number of people believe iguanas are perfectly wonderful unconscious, unfeeling creatures with few more sensibilities than bugs. Such misperceptions block our understanding of iguanas, and what they need as pets. These lizards are cognizant vertebrates with fully developed central nervous systems. They can experience fear, discomfort, and in captivity, boredom or depression. Iguanas who "lie there and do nothing" are unhealthy, or depressed. Iguanas will spend time basking or digesting a meal, but that is just part of iguana life.

Green iguanas are social beings. They possess ornamental scales, colors, and elaborate head and body language: "Sixty-nine elementary postures and movements of head, eyes, jaws, tongue, appendages, trunk, limbs and tail are distinguished, as well as fifty-two more complex or integrated behavioral elements...The behavioral inventory as described in the present investigation is by no means complete."³ In the wild, iguanas

"Moreover, the correct name of this handsome green creature is *Iguana iguana*, Family Iguanidae. He is obviously from a proud race."

do not amble around randomly, but live in communities. They see each other's colors and gestures for they have excellent vision. What is an isolated, captive iguana to do with his language and showy scales? If he bobs his head, who answers? His human keeper can answer. If a single iguana is desired for a pet, the keeper needs to spend time with that lizard, because captive iguanas need things to do. They need a life; a routine of activity. Activities can include warm water baths for exercise and cleansing, basking or exercising time out of the cage, hand feeding, and just being with the iguana. Iguanas raised alone are generally even-tempered, less active, and easier to manage. Routine maintenance is minimal, but again, the lizard cannot be left alone, day after day, with nothing to do or an apathetic pet results. It is not uncommon for a new iguana keeper to dispose of an iguana who has failed to be an exciting pet.

When iguanas are raised in pairs or groups, their lives are more complete; their social behavior fascinating. Some care information suggests that iguanas do not get along with each other and so, should be kept apart. Indeed, iguana husbandry becomes more complicated with the size of a group. One learns that mature males will fight over territory; that females may fight over males, and select nesting sites. In the presence of a male, a female will probably develop eggs, whether fertilized or not. Gravid (pregnant) iguanas require extra attention. Larger iguanas will displace smaller ones from choice basking sites. Etcetera. So the more iguanas one has, the more work one has. But one gets to know green iguanas as green iguanas.

The survival statistics for captive iguanas are grim, but more and more people are getting to know these wonderful lizards. Anecdotes about iguanas becoming beloved family members, classroom mascots, and long-term companions who return their owner's affection are popping up in newspapers and magazines with greater frequency.

How does one have the best experience with iguana keeping? Realize the commitment involved before acquiring pet iguanas. Care for your pet, or pets. Like any living being, warm or cold blooded, iguanas need a comfortable environment. They can and should live for 10–20 years. They are large, tropical animals with sim-

ple, but specific care requirements. Read all you can about green iguana care and behavior. And look at each lizard. Not only will you learn about a fascinating animal, it's fun.

The following husbandry basics are offered: 1) temperature/ light control, 2) complete nutrition 3) psychological comfort. Night and day temperatures may range between 65°F–85°F. Several hours daily of temperatures in the 90°F range must be provided for proper digestion, development and growth. Iguanas regulate their body temperature by behavior, so a temperature gradient within an enclosure is needed. They must be able to move close to or away from a heat source. Unfiltered sunlight (not passing through glass or plastic) is part of an iguana's health requirements. Where and when sunshine is unavailable, Vitalite® (not Grolite®) is an acceptable substitute. Nutritious foods include greens like dandelion, mustard, collard, turnip, chard, arugula, and kale; vegetables such as carrot, sweet potato, pumpkin, beans and peas; plus fruit items like papaya, apple, pear, plum, blueberries and mango. Captive animals need refuge from constant scrutiny. Provide a hiding box for privacy, provide adequate space for each lizard, and handle your pet or pets gently.



For information about iguanas, or their captive care:

Iguana Times, Vol. 4, No. 3 (September, 1995). The Journal of the International Iguana Society has an excellent, concise care outline. Becoming an IIS member supports environmental and educational activities on behalf of iguanid genera, and their habitats.

Iguanas: A Guide to Their Biology and Captive Care. Fredric L. Frye, B.Sc., D.V.M., M.Sc., CBiol, FIBiol and Wendy Townsend. Krieger Publishing, Malabar, FL.

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INTERNATIONAL SWEEP TARGETS REPTILE SMUGGLERS

February 1, 1996

NEWS RELEASE

from the U.S. Fish and Wildlife Service

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Suspected smugglers of various reptiles, including the frilled dragon, were served search warrants today by special agents of the U.S. Fish and Wildlife Service. The warrants were issued as part of an international investigation involving reptiles illegally imported from Indonesia, Australia, the Netherlands, and other countries.

The investigation into reptile smuggling in the United States was initiated by a request for assistance from the Netherlands Ministry of Justice, Netherlands National Police, and Netherlands Ministry of Agriculture, Nature Conservation, and Fisheries.

Federal search warrants were executed in New York, Florida, North Carolina, and New Mexico in coordination with other warrants executed at businesses and residences in Indonesia and the Netherlands. Officials from the Netherlands uncovered the elaborate smuggling scheme involving live reptiles, including the frilled dragon (*Chlamydosaurus kingii*), shipped out of Indonesia, into the Netherlands, and then on to other European countries and the United States.

The United States is the world's largest importer of wildlife and in recent years the demand for live reptiles as collectibles and exotic pets has increased rapidly. The various species of reptiles involved in the investigation are highly prized by collectors in Europe, Japan, and the United States.

Frilled dragons, certain Australian and Indonesian skinks, pythons, and some unique turtles, all species of concern in this smuggling investigation, may sell in the United States for \$250 to \$1,500 each. These animals are protect-

ed by law in their countries of origin and their export is tightly controlled. Although some of these species can be bred in captivity, the high level of demand by reptile collectors often encourages smuggling of wild-caught specimens.

The frilled dragon, used as a model for Jurassic Park's spitting dinosaur, is a non-venomous 18-inch-long lizard native to Indonesia and Australia. This reptile is particularly striking when it becomes excited and opens a scaly fold of skin surrounding its head. The lizard is also remarkable for standing upright and running on its hind legs.

The Netherlands Police began their investigation into the illegal trafficking of protected reptiles from Indonesia in September 1994. They gathered information for more than a year before initiating an official request for assistance through international channels to the U.S. Department of Justice. Through an agreement with the Kingdom of the Netherlands, known as the Mutual Legal Assistance Treaty, the United States and the Netherlands provide a broad range of cooperation with each other in criminal matters. Special



Subadult Iguana iguana. Photograph: Bo Staten



Exuma Island Iguana, *Cyclura cyclura figginsi*. A male animal was offered for sale by a southern California dealer with the motto "If it's rare..., we can get it for you," despite the fact that no iguanas of this species have ever been legally imported from the Bahamas. Source: I.I.S. members, Ministry of Agriculture, the Bahamas.

agents of the U.S. Fish and Wildlife Service were chosen to assist the Department of Justice because of their expertise in wildlife import, export, smuggling, and illegal commercialization offenses.

The U.S. Fish and Wildlife Service and Netherlands and Indonesian authorities continue to investigate illegal trade in reptiles. Reptile smugglers in the United States face possible Federal conspiracy, smuggling, false statement, and money laundering charges. The investigations in the United States are being coordinated by the United States Attorney's offices in Miami, Florida; New York, New York; Greensboro, North Carolina; and Albuquerque, New Mexico, with

support from attorneys in the Wildlife and Marine Resources Section of the Environment and Natural Resources Division of the United States Department of Justice.

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ILLEGAL TRADE IN REPTILES: TRAFFIC PROTECTED BY A LEGAL VOID

The following article, written by an anonymous author, was published in the newspaper La Prensa, in the Central American country of El Salvador, on July 24, 1995. The text was translated from Spanish by Floyd E. Hayes of Caribbean Union College, Trinidad, who also assisted with the editing to improve and clarify, as best we could interpret, the original writing.

El Salvador is a country of the fourth category—thanks, in a grand measure, to the green iguanas. As the principal bridge for traffic in these reptiles at the world level, our country has been classified by CITES (the Convention on the International Trade in Endangered Species) as a nation “without even minimum legislation for applying protection for animal species.”

With respect to CITES, our country is decidedly a fourth category, derived from the illicit traffic in iguanas, which is estimated to surpass 5,000 animals daily during the actual hunting season that began last March. This has evidently resulted in a “temporary” sanction, since the 16th of June, in which the exportation of these reptiles has been suspended for an indefinite period. As a consequence, the principle perpetrators (including some among the 11 legal iguana farms) “are ripping their clothes apart,” according to authorities of the National Park and Wildlife Service.

The suspension of the permits for exportation of these reptiles is irrevocable until the country can demonstrate to CITES, which is based in Geneva, that it is capable of exercising legal control over the excessive traffic in iguanas. The problem is centered precisely on the lack of an approved legal framework for applying the requirements of CITES. Maria Luisa Reyna de Aguilar, the scientific authority for CITES in El Salvador, pointed out that the lack of government regulation has been the lifeline for the illegal trade, which fails to pay attention to existing agreements. A test of our

country’s ability to regulate the trade, for example, was the authorization this past 6th of April for J. R. Animals (property of Juan Francisco Rosales) to resume its exports to Miami.

In essence, the illicit trade was “protected in that no legal instrument exists at the moment for the regulation of animal farming,” points out CITES. Not unexpectedly, according to National Park and Wildlife Service, this approval aggravates the differences among the 11 authorized iguana farms in the country, which are currently divided into the Salvadoran Association of Reptile Farms (ASCREP) and the Association of Fishery Producers and Exporters (ASPRYEXA). According to authorities from the National Park and Wildlife Service, “some of them have been complying with the agreements to export a maximum of 51,000 neonates, whereas others have persisted in ignoring the agreements. Now all should respect the suspension, regardless of whether or not they previously respected the CITES agreements.”

Without doubt, although the country lacks an internal legal framework, regulations are in place at the international level. Actually, El Salvador has been a signatory nation to CITES (which regulates animal traffic in 130 countries around the world) since 30 April 1987. The National Park and Wildlife Service has been responsible for applying the agreements of the convention since 27 June of the same year. Almost a decade later, the Wildlife Conservation Law was approved last year by the Assembly through decree number 844, thus strengthening the previous CITES agreement.

According to authorities of the National Park and Wildlife Service, the enforcement and observance of the law, which “in its character is a special law that takes precedence over any other conflicting law in El Salvador,” has been required since the 8th of June, 1994. For now, the Environmental Division of the police can only confiscate animals and patrol areas where most of the

illegal traffic occurs. But according to the authorities, "beyond that nothing in terms of enforcement happens due to the absence of legal handling, even though everybody knows that the animal trafficking is illegal."

The confiscated animals are delivered to the National Park and Wildlife Service for their later release into nature. Together with enormous quantities of iguanas, the authorities frequently confiscate macaws, parrots, toucans, raccoons, and caimans.

The zones with most of the illegal traffic occur along the fringes of Las Chinamas, El Poy and El Amatillo, in addition to approximately a dozen obscure points along the Honduran border. Gravid iguanas (with eggs) continue to be sold for up to 150 colones [exchange rate?], and neonates (in this case, iguanas between 2-3 months of age) fetch an average of \$1.50 each. There are indications that at least 20 illegal animal farms operate



A vendor displays his day's catch for sale on a highway near Respire, Honduras. The iguanas are sold for a dollar each and sometimes eaten locally. Photograph: Associated Press

primarily in Cabañas and San Miguel, in the eastern part of the country. As laundering centers for the iguanas, these farms aggravate the situation.

The trick for them is to introduce reptiles to the unauthorized farms and later relocate them to the legal farms. As Aguilar stated, "To make a comparison, the depredation of iguanas is as though anybody who wants to could raze or burn down Montecristo due to the absence of legislation, although previously the place was protected like a national park. It is known that these things should not be done, and are regulated at the international level. But what is missing is a legal hook at the national level." In addition, the state bureaucracy hardly helps.

It is anticipated that during the remainder of 1995, three more important regulations will be passed. These will strengthen the legal framework required to enforce the Wildlife Protection Law [presumably the aforementioned Wildlife Conservation Law], as well as reinforcing the CITES regulations. The latest actions are apparently too slow, however. CITES affirms that since the efforts initiated by Antonio Cabrales, the ex-Minister of Agriculture and Livestock, there have been three preliminary proposals, but none have been acted upon. According to the respective authorities, "These proposals, especially the regulations for establishing and managing wildlife farms, together with technical guidelines for the captive management of the species *Iguana iguana*, have been presented without obtaining any response" from the legislature.

Most unfortunately, time is passing, and the sanction imposed against the exportation of iguanas will not be lifted until it is demonstrated that minimum legislation exists for protecting this species. By not passing legislation, the temporary suspension may next degenerate into a complete embargo, in which the CITES headquarters will recommend that all countries buying Salvadoran iguanas must cease from importing them.

Naturally, the unanswered questions are: what will happen to the hundreds of thousands of iguanas ready for exportation, and what will become of the iguana farms?



ABSTRACTS OF SCIENTIFIC PRESENTATIONS

THIRD ANNUAL MEETING OF THE INTERNATIONAL IGUANA SOCIETY

NOVEMBER 13-18, 1995

SAN SALVADOR ISLAND, BAHAMAS

Population Genetics of the San Salvador Rock Iguana, *Cyclura r. rileyi*. Ronald L. Carter and William K. Hayes, Department of Natural Sciences, Loma Linda University, Loma Linda, CA 92350 USA.

This study examined the population genetics of the iguana endemic to San Salvador, Bahamas. Blood samples, yielding purified DNA's, were collected from 53 individuals collected from six cays (14 from Green, 6 from Pigeon, 4 from Low, 14 from Goulding, 11 from Manhead, 4 from Guana). One individual from each cay was used in a preliminary study to survey 10-mer primers for Random Amplified Polymorphic DNA analysis (RAPDs). Out of 96 primers surveyed only 24 showed polymorphism. DNA from each of the 53 iguana samples were individually PCR amplified with each of the 24 primers. On average, each primer amplification yielded 5 scoreable bands (total = 70 bands). Fourteen of the 70 bands generated from the 24 primers produced informative polymorphism. Data from banding patterns were analyzed by UPGMA and GensStat-PC 3.3. Nei's gene diversity statistics indicate that individuals from Green Cay have the greatest level of heterozygosity ($H_u = 0.3488$) and that the Pigeon Cay population possesses the least genetic diversity ($H_u = 0.1394$). The other populations show intermediate levels of heterozygosity ranging between $H_u = 0.2346$ and 0.2721 . Chi-square tests indicate significant differences in band frequencies among populations ($p < 0.01$). Cophenetic clustering of primer produced bands indicate that individuals from Green, Guana and Manhead Cays are most similar, and that individuals from Low and Goulding Cays cluster closely together. Banding patterns from Pigeon Cay individuals are most dissimilar from the other populations. The presentation will discuss the techniques involved in RAPDs analysis and the data that suggests population substructuring. Possible implications of these data for genetic resource management of San Salvador iguanas will also be discussed.

Characterization of Feeding Behavior in *Iguana iguana*. Catherine Dickert, Pok-O-MacCready Outdoor Education Center, 112 Reber Road North, Willsboro, NY 12996 USA.

The importance of salt and alkaloid content, and the effect of food color of potential food items in the diet of captive green iguanas were investigated. Food color was found to be an important food characteristic, with red, yellow and orange foods being chosen most often over green, blue and white foods. The salt content of food options was not an important factor in food selection when the concentration of salt on the food item was 3%, the concentration of sea

water. Inconsistent results were obtained in the alkaloid detection section of the study, and whether or not the presence of alkaloids in food items acts as a deterrent to feeding on a plant is not made clear by the results of this study. The behavior of geophagy was also observed in two adult captive green iguanas.

Distribution and Abundance of the Turks and Caicos Rock Iguana, *Cyclura c. carinata*. Glenn P. Gerber, Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN 37996 USA.

A population survey of the Turks and Caicos rock iguana was conducted between May and August 1995. Over 100 cays were visited during the survey, encompassing the entirety of the Turks and Caicos. Although historically iguanas likely occurred on all vegetated islands, they have been extirpated from many islands in recent times. In particular, iguanas are absent from most of the islands which are, or have been, inhabited by humans. However, iguanas are still abundant on many uninhabited islands, including a number of the small cays surrounding inhabited islands. The presence of introduced mammalian predators (cats, dogs) and free-ranging or feral livestock (goats, donkeys, horses, cattle) appears to be the most important factor contributing to iguana extirpation or rarity.

Nesting Ecology of the Mona Island rock iguana, *Cyclura cornuta stejnegeri*. Bernd Haneke, 507-D Channel Marker, Mary-Esther, FL 32569 USA.

The Mona Island iguana is a threatened species. The population is thought to be at an all time low due to predation and competition by feral animals. Furthermore, the population appears to be very aged, and there is a high mortality rate in hatchling iguanas due to feral cats. In October and November 1994, I studied the nesting areas of the iguana using a Geographic Information Systems (GIS) based Gap Analysis. This GIS was used to predict unknown nesting sites. Known and predicted nesting sites were subsequently visited and evaluated for their use by iguanas. From this research I was able to establish that nesting success is dependent upon location. Although successful nesting occurs on some beaches, in the interior of the island all of the nesting sites appeared to be completely destroyed by feral pigs. Continued research and direct intervention, for which I offer recommendations, are essential for the continued conservation and survival of the iguana on Mona Island.

Population Surveys, Body Size and Conservation of the San Salvador Rock Iguana, *Cyclura r. rileyi*. William K. Hayes and Ronald L. Carter, Department of Natural Sciences, Loma Linda University, Loma Linda, CA 92350 USA.

The San Salvador rock iguana, *Cyclura r. rileyi*, is a subspecies of one of three Bahamian iguana species, all of which are considered endangered. Virtually extirpated on the main island and on a handful of San Salvador's satellite cays, known remaining populations are confined to six tiny offshore cays and two islets within Great Lake. Lincoln-Peterson population estimates on two cays (based on resightings of marked iguanas) and censuses on other cays suggest a total population of 600-700 iguanas; however, numbers of juveniles are likely underestimated. Body size varies significantly from cay to cay, and appears to be positively correlated with the number of plant species present. Several threats to long-term survival were identified. These include the larvae of an introduced moth that are devastating the prickly-pear cacti which comprise a major food source on several cays, particularly Green Cay; feral rats on Low Cay that may prey upon iguana eggs and juveniles (the population consists almost exclusively of aged adults); and an unknown cause of mortality that recently decimated the Guana Cay population.

***Cyclura* Social Behavior: A Comparative Perspective.**

Emilia P. Martins, Department of Biology, University of Oregon, Eugene, OR 97403 USA.

The success of campaigns in which captive iguanids are reintroduced into the wild depends to some degree on the abilities of animals born and raised in captivity to survive in the physical and social environment where they are released. Iguanas of the genus *Cyclura* exhibit an amazing diversity of social behavior, with individuals of some species living relatively solitary lives in the field, and others interacting nearly constantly with other iguanas. This diversity suggests that both cultural and genetic factors have played a role in the evolution of behavior in this genus, and makes *Cyclura* an outstanding model system for studying the evolution of social behavior. An examination of *Cyclura* social behavior and the communicative displays which mediate it in a phylogenetic context shows that there have been several independent evolutionary changes towards complex social behavior, and allows us to identify key species for future work. Future studies of behavioral development in these species will help us to understand the interactions between genes and environment in producing adult behavior, and can aid in the success of reintroduction efforts.

Differential Behavior and Predation in Both Sexes of the Green Iguana (*Iguana iguana*). Jesus A. Rivas and L. E. Levin, Department of Psychology, University of Tennessee, Knoxville, TN 37996-0900 USA and P.O. Box 47106, Caracas 1041-A Venezuela.

Hatchling green iguanas show complex social behavior related to predator avoidance. Field observations on the anti-predator behavior of free-ranging individuals suggested the presence of some cooperative strategies involving sexually dimorphic behavior. Two sets of experiments were performed: 1) exposing both sexes to a model of a predator, and 2) assessing whether the two sexes had differential mortality when facing natural predators. The first tests showed that males performed more risky behaviors and exposed themselves more to the model (Chi square $p < 0.05$). The second set of experiments showed that males were predated more often (Wilcoxon-signed-ranks test, $p < 0.03$). The higher exposure of the males to predators could be the proximate cause for the differences in mortality. A possible ultimate explanation is that males, altruistically, expose themselves more to predators benefiting related females. This is the first record of kin selection, other than parental care, reported in any reptile.

Trade in Live Iguanas. Joseph Ventura, U.S. Fish and Wildlife Service, 16 Hoover Lane, Bethpage, NY 11714.

U.S. Fish and Wildlife Service data (LEMIS) were examined to find trends involving the trade in live iguanas (*Iguana*, *Ctenosaura similis* and *Cyclura* spp.). In general, the trade in live iguanas has increased over the past several years at a remarkable rate. The passing of national legislation in several South and Central American countries has been the main factor regarding changes in the live iguana trade. Until about 1991, the bulk of iguana imports consisted of wild collected green iguanas, supplemented with smaller numbers of wild collected spiny-tailed iguanas. Most specimens came from South American countries such as Peru, Colombia and Guyana. After 1991, this situation was replaced with enormous numbers of hatchling green and spiny-tailed iguanas supplied by the "ranching" operations of a few Central American countries. A discussion of shipping methods, current legislation and violations involving iguanas will follow

OTHER PRESENTATIONS

Personal Experiences with Iguanas

John Bendon

Conservation of Bahamian Iguanas

Sandra Buckner

Outdoor Captive Husbandry of Iguanas

Robert W. Ehrig

Spiny-tailed Iguanas

Bruce Elfström

Common Shoreline Vegetation of the Bahamas

Richard Moyroud

Retrospectives on Conservation of the Mona Island Iguana

Tom Wiewandt



IGUANA: SURVIVAL OF THE TASTIEST

SORREL DOWNER

REPRINTED FROM COSTA RICA TODAY, OCTOBER 21, 1993

Green iguanas are already a threatened species—and soon they'll be featured on the best Costa Rican menus. What's more, every environmentalist will be duty bound to eat as many of them as possible.

This is not an inversion of logic or a ploy to get rid of the *Iguana iguana* to make space for something more attractive, but a move away from the idea of preservation towards a more realistic sustainable conservation.

Preservation, involving a patch of land, a perimeter fence and a Keep Out sign, ignores people's needs and human nature; it creates a conflict of interest and eventually forces protection to be compromised. Sustainable conservation projects take into account that rather important factor—man's need to make a living, and look for practical ways of protecting wildlife and the environment while creating jobs and generating enough profit to make it all worthwhile.

To sustain the delicate balance between man and his environment, it is almost always necessary to take a few steps back in time, to revert to old methods of farming and production or even to reintroduce traditional produce and handicrafts.

German biologist Dr. Dagmar Werner's pioneering iguana farming project is sustainable conservation at its best. Throughout Central America, iguanas have been regarded as finger-lickin' good since time immemorial. (One 16th century conquistador reported that they were "a most remarkable and wholesome food" but the colonists still cleared the ground for cattle.) Today, although much of the forest habitat of these tree dwellers has disappeared and iguana numbers have dwindled, there is still a bit of rural demand for the pollo de palo, or "chicken of the trees."

It's impossible to prevent the illegal poaching and selling of iguanas and it's unlikely the demand will die out before the iguana does. So Dagmar Werner is doing the only sensible thing

and increasing supply. Her Green Iguana Foundation aims to increase the iguana population through a protected breeding program that encourages people to farm them.

Iguanias are easier to farm than cattle. They don't wander off and need no fencing. They yield more than 10 times the amount of meat per hectare, need a minimal amount of attention and, most importantly, don't require a huge area of deforested land to graze and reduce rapidly to dust.

Quite the reverse, to raise iguanas, farmers need to protect their existing forested areas and also reforest cattle pastures with the sort of native trees that iguanas like best. Thus, the project restores the iguana population. It provides Costa Ricans with an ample supply of product they like. It generates a new line of business for small farmers and offers financial inducement for cattle farmers to reforest their pastures and farm iguanas.

The long-term aim is reforestation. The immediate benefits are obvious to the iguanas and to the communities surrounding the reserve. The farmers are given loans for the equipment and craft training to start businesses through the foundation's extension projects in order to regenerate the area.

The wiry Dr. Werner, who has been variously described as "aggressive, a go-getter and a little nuts," spent seven years studying iguanas in the Galapagos islands before being appointed director of the Smithsonian Institution's Iguana Management Project in Panama back in 1983.

When Panama's political climate began to jeopardize future funding, Werner took a teaching post at the National University and arrived in Costa Rica accompanied by 1,200 iguanas. There is an organization in Costa Rica called the IDA which leases out land seized from the terratenientes, or land barons, after the 1949 Civil War. The IDA allocates 12 percent of this land to conservation projects and provided Werner with a beautiful 280 hectare (700 acre) tract, lying

between Carara Biological Reserve and the Turubares Forest Preserve, on which to continue her pioneering work.

There are thousands of sun-bathing iguanas in the cages at the Green Iguana Reserve. The youngest are slim, turquoise and fast on their feet. The sound of footsteps is enough to trigger a writhing heap of iguana panic and a lot of scuttling as they slither and slide over corrugated iron to get inside one of their bamboo pipes.

Most will be released at seven months when most of the danger from predators is past. Some will be kept for breeding. These veterans are fat [they can reach six kilograms (13.2 lb) after three years], slow and watchful, with thick, powerful tails, spines and slack jaws. They have also turned dull greenish brown, a camouflage that blends well with the type of branches they need to support their bulk as the bluish green did with the fresh young shoots they used to romp about in during their salad days.

One hundred thousand iguanas have already been released in the wild. Werner's success with breeding and raising iguanas has surprised the scientific world. When the farming project was first proposed, a group of scientists were employed to make a feasibility study. They studied nutrition, maintenance and behavior and concluded that it would take 20 scientists 100 years of research each



to discover whether iguana farming was possible.

Werner took things into her own hands and three years later released her first home-grown iguanas into the wild. "It was very simple," she says. She believes her success has more to do with intuition than her scientific background and admits to thinking like a farmer and perhaps, a bit like an iguana—although female iguanas, apparently, are very hard to fathom.

Feeding them is easy. They like leaves, flowers, passion fruit and papayas and they don't need entertaining. The hardest part was working out the best male-to-female ratio.

"There needs to be a level of arousal," says Werner. Establishing territorial rights, fighting over females and general bullying is all part of a male iguana's warm-up to mating. No fighting, no reproduction.

On the other hand, if there are too many fighting males the females will say, according to Werner, "Oh my god, this is not a stable situation. I'd better emigrate."

The feasibility studies never even got on to the subject of marketing. This is where the real problems lie. How do you tell a farm raised iguana from one that's been illegally poached? "I don't want to put a new item on the market if I can't guarantee a legal market," says Werner. Because people are entitled to collect and sell turtle eggs laid during the first arribadas at Ostional, eggs are stolen from nesting areas all over the country throughout the year and sold as "legal" Ostional eggs. Werner has been careful to ensure that the legal iguana trade won't encourage a similarly increased illegal trade. When the first batch of foundation iguana meat hits the market early next year [1994], it will be sold through a limited number of licensed retailers and served at a restricted number of restaurants.

Between now and then the foundation is working to change iguana meat's image from poor man's food to rich man's delicacy. Foreigners who find the whole idea hard to swallow should bear in mind that iguanas, like everything on most people's essential shopping B-list like snake and frogs, taste just like chicken and has, with the possible exception of seafood, the low-

est fat content of any meat making it a must for environmentally friendly healthy eaters. Worth noting also is a marketing survey which reveals that out of the 21 percent of Costa Ricans who've tried it, 95 percent liked iguana.

Iguana ham, iguana sausages and smoked iguana will be among the first delicious lizardly products to come on the market. As well as being available in various Central Valley outlets, they'll be sold at the Green Iguana Reserve shop and Visitor's Center which is due to open early next year.


Here, too, you'll be able to buy the results of the foundation's handicraft training schemes along with all manner of seeds, plants and medicinal herbs from the surrounding area and souvenirs with an iguana slant, like iguana brooches.

Profits will go towards reforestation and community development.

The difference between preservation and conservation is, on the surface, subtle, but contextually, it can make a world of difference. Preservation can be defined as keeping things the way they are, reducing or eliminating human impacts on an area. Conservation preserves an area through low-impact or traditional interactions with the people who have lived in the area for generations. Instead of chopping down the forest to build golf courses and hotels and huge visitor centers, as is happening in and around the Parque Nacional Manuel Antonio, the Green Iguana Preserve conserves the wild plant and animal life in the area while providing the local communities with the means to earn a living by harvesting, not depleting, the natural resources of the area.



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Iguana Iguana: A Guide for Successful Captive Care

Fredric L. Frye. 1995. Krieger Publishing Company, Malabar, Florida. 178 pp. + 24 plates, Hardcover, US \$39.50. ISBN 0-89464-892-6.

Reviewed by Breck Bartholomew, 195 West 200 North, Logan, UT 84321

This book is based on the book *Iguanas: A Guide to Their Biology and Captive Care*, but don't let this fact fool you. When I read the first book I disagreed with much of the information and the approach to Iguana keeping. I told several people that they were better off buying *The Green Iguana Manual* by de Vosjoli than *Iguanas*. Some of the reviews of this first book were also critical to say the least. Thus it was with some apprehension that I began reading the book *Iguana iguana*. Fortunately, improvements were noticed readily and my apprehension dissipated quickly.

In revising the book, Frye has paid close attention to the criticisms of the previous work and it shows. The approach to iguana keeping is less "cuddly" and more responsible. Veterinary aspects play a greater role in the revised work.

The first chapter, "understanding green iguanas," offers some basic information about iguanas in general, before focusing on the green iguana. The section on selecting a green iguana offers good insights to help identify healthy animals as well as suggesting medical examinations for all newly acquired iguanas. The chapter goes on to describe many common behaviors, some of which have needlessly caused alarm to the new iguana owner. Another important aspect of this chapter are the sections on handling, restraint, and carrying. These sections will certainly help save many iguana toes and help reduce stress among both iguanas and owners.

Chapter 2 delves more deeply into husbandry techniques with an emphasis on proper caging. In addition to the size and type of cage, Frye discusses ways to reduce stress when multiple iguanas are housed near each other. Light, heat, water, and temperature are discussed as well as waste management, substrates, and furniture. The third chapter describes the digestive system and how it works, then builds on this knowledge to discuss feeding and nutrition. A diet is recommended that is consistent with our knowledge of wild iguanas and the problem of feeding animal protein is discussed. Frye emphasizes a well rounded diet of vegetables and includes a discussion about commercial iguana diets. Most commercial iguana diets were found to be inadequate; thus I found it odd that Appendix C lists 10 sources for commercial diets. Specific plants are discussed and nutritional values of several plants are presented in tabular form. Plants that might be toxic to iguanas are presented in Chapter 4.

The next five chapters make up the heart of this book. They discuss medical disorders and treatments of green

iguanas. All of the common, and many of the uncommon, medical disorders found in green iguanas are presented in a way that will be beneficial to many iguana owners. Although, some of the topics require specific jargon that may require some veterinary knowledge, most of the text will prove understandable to the average reader. Frye discusses symptoms, separated for quick reference, then suggests treatments. This is not, however, a do-it-yourself manual. Among the many important aspects of these chapters, two stand out in my mind. First, these chapters enable iguana owners to identify when their lizard is sick or unhealthy and give them an idea of what is wrong. Secondly, veterinarians will be able to refer to these chapters to help diagnose and treat the lizard more effectively.



"It's Alive!" Iguana Owner's Manual: Iguana Understanding, Care and Service.

Henry Lizardlover. Prymal House Publishing, 10700 Santa Monica Blvd, Suite 4-378, Santa Monica, CA 90025. Reviewed by Deina Boismier.

It looks as if this book were thrown together at Kinko's Copies—if I had known that this is supposed to be the "book" I would have never sent \$28 for it. Along with that fact and that the ad in Reptiles Magazine says it will be shipped in 5-10 days UPS, when I received mine a month later in regular mail, I'm severely disappointed.

It looks like a cheap booklet. I've seen better material published for SCA events, with a much cheaper price tag. The information seems to be thrown in randomly—one minute you're reading about Character, the next Nutrition, then Behavior (wouldn't that fit better under Character?). As far as the information goes, most of the info he includes seems to be common knowledge, or found in other books. He's very repetitive (which he does warn about in the introduction), but I think if he stopped repeating the same thing over and over, there really wouldn't be much bulk to this "book". The photos (or photocopies of photos) are annoying and they, too, are repetitive. I felt that the clippings of his newspaper articles were unnecessary.

One paragraph in the book annoyed me to no end. Under "Character" (page 11)—he says (in my own words) that if you have a problem iguana and haven't been able to "train" it over months and months, you have his "permission" to sell it to a pet store, or let someone else try their hand. That's stupid! That's just passing the buck—pet owners have responsibilities, and you can't be guaranteed a "perfect" animal. That statement is just as stupid as someone telling me that if I'm having problems with my daughter, and am unable to control her behavior, I have permission to put her up for adoption, or give her away to someone. There are enough pets, reptiles, dogs and cats dumped and left for dead because people don't want to deal with them and the problems they may encounter. Giving it away isn't

B O O K R E V I E W S

the answer (unless the owners are jerks and decide to just outright neglect the animal, in which case, they should have never considered getting it to begin with).

Overall, I'm not impressed with the book. I could have found better things to do with my money.

Reprinted with permission from Melissa Kaplan's home page on the World Wide Web.



Your Easy Guide to Care, Training and Breeding of Common Green Iguana. Dolly Ellerbrock.

43 pp., 9 b&w illustrations, several b&w cartoons. Illustrations by Jo Jo Veltri. Photography by Kevin Ritchey. 1995. ABELexpress, Carnegie PA.

Reviewed by Helen Benton.

I was attracted to this booklet by the cover, which features a beautiful, arrogant male iguana, flaunting his breeding colors and displaying a battle-scarred dewlap. This short booklet consists of 10 chapters, a Q & A section, a short list of source materials, and a glossary.

Unfortunately, my attraction was rapidly dispelled as I delved further into this book and discovered a significant amount of misinformation and numerous technical errors in the form of misspelled words and poor phrasing.

Contrary to the author's statement early in the book, common green iguanas do not make wonderful pets for people of all ages! Unless you are willing to work closely with a competent reptile veterinarian, please do not purchase one.

The first chapter, on caging, was informative but long. I wonder about the author's priorities. So much space (over 20%) given to the building of the cage, but diet and medical problems resulting from poor diet were barely mentioned. She mentions metabolic bone disease (MBD) but notes only that it is caused by "improper diet." She does not address the issue of the required 2:1 calcium/phosphorous ratio in the diet, nor does she share with her readers adequate information regarding the prevention and treatment of MBD. This is a major medical problem suffered by iguanas in captivity and is due primarily to the low calcium level in the blood [resulting from insufficient full-spectrum UV-light]. This should have been given a much higher profile in the book than it was. It should also have been explicitly stated that no animal protein should be given to iguanas.

I have frequent blood profiles done on my iguanas, as this is [one] way to determine their nutritional status. In addition, all of my iguanas have frequent check-ups consisting of fecals, cultures and sensitivities, and CBC, as well as the blood profiles.

The author mentions Salmonella but does not adequately address the issue of health concerns caused by zoonoses (diseases transmitted from animal to man). Never clean reptile cages or equipment in food preparation areas, such as the kitchen sink or counter.

I was amused with the chapter on training but decided to try her methods when my "alpha" male, Fred, was engaged in some very forceful and potentially injurious

breeding activity (jaws clamped tightly on flesh) with one of his wives. I informed him that he was a bad boy, and used some of the author's suggested phrases and words like "stop," "no hurt," "no bite," and "release," hoping that her ideas would work. When it became apparent that Fred and I had a communication problem, I used my tactic—a bowl scraper to pry his jaws open, heavy gloves for me (even a very gentle male will become very annoyed at being separated from the object of his attention), and for his battered wife an isolation tank, Betadine and New-Skin.

At the end of the book, the author quotes Fredric L. Frye, DVM, as being very helpful with information, but she not only misspells his name when she lists her sources, she also fails to credit him with his two very informative books on iguanas.

For a book only 43 pages in length (with lots of white space on each page), there are far too many typographical, spelling, and usage errors. Examples: p. 7: "Note: using screws instead of nails are recommended." P. 14: "Placing your locks 1 high and 1 low will prevent accidental opening and escapes." P. 19 and p. 42: "Blood-stop or septic pencil...; Veterinary blood clotting gel, powder or septic pencil." P. 36: "Hatching are usually twenty centimeters long." P. 42: "...controlled by a reastat or thermostat." In at least one place, the information given is inconsistent with another part of the booklet. On p. 37, for example, we are told that "Iguanas snort—they do not sneeze." In the 17-term glossary, however, "Snorting = Sneezing."

The author's use of the term "UVD Light" (whatever that is) is a mystery. The glossary defines UVD Light as "(Sunlight) Ultraviolet vitamin D₃ synthesis. To help with digestion." UVB Light is defined as "Ultraviolet black light. To help with the photo chemical of the vitamin D₃ synthesis." The discussions of this matter in the text (pp. 16-17) are of no help; the description of the heat/light sources are so confusing that no sense whatever can be made of them. This can have serious consequences for the novice iguana keeper, as proper light and heat are critical for an iguana's well being.

I applauded the author's love and dedication to the iguana, but before she attempts another book, she should research her subject—and have it reviewed and proofread (these two are different) by qualified individuals. Books such as this only mislead and confuse the novice iguana owner and may result in some otherwise avoidable medical problems for the iguana. The market has become flooded with hatchling iguanas, and they are priced low enough to be labeled disposable pets. Literature regarding the care of these lizards should be accurate, comprehensive, and documented; this booklet fails to meet those standards.

I would like to thank my friends and veterinarians for their opinions and views about this book: Fredric L. Frye, DVM; Donald L. Burton, DVM; Todd R. Swanson, DVM; Ann Crafton, DVM; and Martin J. Rosenberg, Ph.D.

Reprinted with permission from the September 1995 issue of Notes from NOAH 12(12):9-11.

LIZARD LETTERS

Successful Treatment of Fungal-Infected Iguana Eggs

My wife and I have been keeping reptiles for a number of years. In the last eight years our hobby has become a fairly serious endeavor. We found that we could not only keep but we could breed our little friends quite easily because we live in South Florida and the climate lends itself to outdoor enclosures.

We started breeding green iguanas and several varieties of snakes. Over the years we had many successes and some failures. After much research and hard work we arrived at what we believe to be a very good success rate. We then took on some of the more exotic and expensive breeds. We now have breeding *Cyclura nubila*. In the past we experienced some losses during incubation to fungus forming on the eggs. This was disconcerting but we found no information on how to deal with the fungus once it had begun to form on the eggs. With the *Cyclura* eggs this became not only disconcerting because we did not like losing the eggs. I am not referring here to non-viable eggs but to eggs that were fertile which subsequently would develop a fungus during the incubation period.

In 1995 we were incubating 16 *Cyclura* eggs. All eggs appeared healthy and viable. The eggs were from three different clutches. Each clutch was kept in a separate sealed plastic container in an incubator. The containers were set up with a 50:50 mix of sterile vermiculite and water (by weight) and maintained at a constant 86°F. Each container was about half full of the vermiculite mix. The eggs were set into the mix to half their depth. Every three days the containers would be opened for a few seconds to allow a change of air.

At two to three weeks I first noticed a spot of fungus forming on one egg. It was approximately 0.5 inches in diameter. I attempted several times to gently wipe the fungus from the egg. After repeated attempts over several days, the egg developed a brown spot under the fungus about the same size. Within a week the egg collapsed. Upon removal from the container we opened the egg and found the contents to be hard, similar to what a hard-boiled egg would look like.

A day or two later another spot developed on another egg in a different container. We tried the same things with similar disappointing results. Several days later a third egg—in the third container—started to

develop the fungus. The eggs in the latter container belonged to a friend. I called to apprise him of the situation. During our discussion he suggested that we might try some sort of anti-fungal powder. When I got off the phone I went to the medicine cabinet and began to look for anti-fungal powder. Inspiration! I grabbed the athlete's foot powder. At this point I figured it could do no harm. We were probably going to lose the egg anyway.

With a Q-tip I very carefully began to apply the powder each day to the spot on the egg. While doing this I noticed some tiny mites or bugs around the spot. I also brushed them with powder. Within three days the fungus stopped growing. The brown spot remained on the egg. On several occasions during the incubation period I would find fungus beginning to grow again on that egg. Each time I would apply the powder and the fungus would stop forming. This really brought my hopes up that the egg would hatch. The one thing that continued to concern me was that as the other eggs increased in size the "spotted" egg never grew. But I am pleased to report that at the end of the incubation period the little egg with the big spot hatched and the baby, albeit slightly smaller, seems in every way to be quite healthy and growing well. I examined the egg casing and found that the brown spot went right through the egg. It is my belief that the anti-fungal powder did indeed save that egg. In the future I hope I will never lose another viable egg to fungus.

I am including the brand name and active ingredient because I do not know what effect other products might have in similar circumstances. The product I used was Lotrimin AF (anti-fungal), with 2% Miconazole Nitrate. I hope that this information is useful to other amateur herpetoculturists. This use of anti-fungal powder may be familiar to professionals, but I have never encountered anything written about this procedure.

*Carl Fuhri
Bonita Springs, FL*

We suggest opening the egg containers daily during incubation to allow greater air exchange.

Editor

IGUANA NEWS BRIEFS

COLD RELATED IGUANA DEATHS

Many southern Florida IIS members have reported cases of iguana mortality due to cold weather. We have had reports from Miami, Boca Raton, and Ft. Lauderdale of adult green iguanas found dead on the ground, after severe cold, at least by south Florida standards. Although temperatures did not reach freezing, strong cold winds produced wind chills that were fatal to iguanas that stayed in treetops during the cold spells. Colder extremes were recorded in December 1989 in south Florida. The winter of 95/96 had more cold spells and broke many daily cold records throughout the southern peninsula.

IGUANA SUSPECTED AS SOURCE OF ILLNESS THAT KILLED INFANT

SOUTH BEND, Ind. — A 3-week-old boy died of salmonella poisoning that probably was contracted from the family's pet iguana, and health officials warned Thursday that other reptile owners could be at risk.

"I do not know why [pet stores] sell these things," said Diane Jones, Fulton County health nurse. "The least they could do is inform people about this."

Health officials are not even sure how Gaige Becker got salmonella, but Jones said it could have been as easy as someone's handling the iguana and then touching the boy.

While Gaige's story sounds unusual, health officials have seen an increase in unusual strains of salmonella as the popularity of pet reptiles—especially iguanas—grows. The number of imported iguanas rose from 27,806 in 1986 to 798,405 in 1993, according to the U.S. Fish and Wildlife Service.

At least 90 percent of reptiles carry some strain of the intestinal bacteria, according to the Centers of Disease Control and Prevention. The reptiles include snakes, turtles and other types of lizards besides iguanas.

In 1994 and 1995, health departments in 13 states reported unusual strains of salmonella bacteria that were traced back to reptiles.

Gaige died in October in Rochester, Ind., about 40 miles south of South Bend, but the cause of death was not disclosed until a Fulton County Board of Health meeting last month. Gaige died of the Poona strain of salmonella, the same bacteria carried by the family's iguana, which has been destroyed.

The boy's parents, Jamie and Teresa Becker, did not realize the danger that the iguana posed to their son, health officials said.

Salmonella causes diarrhea, abdominal cramps and a fever, and many people who get it do not even realize it. But for people with immature or weakened immune systems—babies, the elderly or those with AIDS—the bacteria can cause severe sickness and, if

not treated right away, death.

Last year, the Atlanta-based CDC began a campaign to encourage veterinarians and pet store owners to make owners of reptiles aware of the risk.

"We're not by any means telling people not to own reptiles," CDC spokesman Tom Skinner said Thursday.

"It's just that we've identified a threat to public health. It's the obligation of our agency to inform people of that threat and inform them of the necessary precautions."

The CDC's recommendations on preventing salmonella:

- Wash your hands after handling a reptile and make sure children do not put their hands in their mouths after touching a reptile.
- Keep reptiles away from areas where food is prepared and do not wash cages, food dishes and aquariums in the kitchen sink
- Do not keep reptiles in child-care centers. And anyone with a weakened immune system, including pregnant women, should avoid them.

THE HERALD, FRIDAY, FEBRUARY 2, 1996.
NATIONAL NEWS
By NANCY ARMOUR
Associated Press

IGUANAS ON THE INTERNET

One recent Wednesday at the Massachusetts Institute of Technology, half a dozen network analysts milled around an office stuffed with computer terminals,

network cables—and a three-foot iguana named Iggy. Iggy happily devoured a kiwifruit under the hot spotlights of a video camera. He then crawled up a stack, under a sign reading "The Iguana Channel," and relieved himself. The camera captured the moment and fed its frames to one of the workstations. The video was digitized, compressed and then broadcast to some 20 viewers in seven countries.

The Iguana Channel was not a pay-per-view event. It was aired free on the Internet, the information highway on which tens of millions of users swap more than 15 trillion bytes of data monthly.

W. Wayt Gibbs
Scientific American
November 1994

DEALER RAIDED

On 1 February, 1996, Strictly Reptiles, a South Broward County, Florida reptile dealer, was raided under a federal warrant by special agents from U.S. Fish and Wildlife Service, Law Enforcement in cooperation with agent from the I.R.S.. Many animals and records were seized including about a dozen smuggled Rhino iguanas. The iguanas were in various stages of starvation, suffering from severe dehydration. Many had badly bruised snouts.

Statement of Purpose

The International Iguana Society, Inc. operates as a non-profit, international organization dedicated to the preservation of the biological diversity of iguanas through habitat preservation, active conservation, research, captive breeding and the dissemination of information.

Subscription Information

Iguana Times, the journal of The International Iguana Society, is distributed quarterly to members and member organizations. Additional copies are available at a cost of \$6.00 including postage. Annual dues for The International Iguana Society are \$25.00 for individuals, \$35.00 for foreign memberships, and \$35.00 for organizations, which receive double copies of the newsletter.

Write to:

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Solicitations

Members of the I.I.S. are encouraged to contribute articles, letters to the Editor, news items and announcements for publication in *Iguana Times*. General articles can deal with any aspect of iguana biology, including conservation, behavior, ecology, physiology, systematics, husbandry, or other topics. Submission of photographs to accompany articles is encouraged.

Manuscripts based on original research are solicited to communicate recent findings not only to other scientists but to the general public as well. We wish to instill in our readers a greater appreciation for scientific research and a better understanding of how it can contribute to the conservation of threatened iguana populations or the well-being of captive specimens.

Research Articles will be subjected to peer review, and should be fairly general in scope (i.e., manuscripts having extremely detailed theoretical or statistical bases should be submitted to more appropriate journals). Manuscripts of any length will be considered, and must be accompanied by an abstract of corresponding length. Authors can expect rapid turnaround time for the reviews and quick publication of acceptable material. Research articles will be cited as appearing in the *Journal of the International Iguana Society*, and will be forwarded to the major citation and abstract journals.

Research Updates should be comparatively brief and written in non-technical language. They will not be subjected to peer review. Submission of photographs to accompany research reports is encouraged.

All manuscripts must be typed, DOUBLE-SPACED, with 1" margins, on 8 1/2" X 11" paper, following a format like that shown in the most recent issue of the journal. Original research articles must be submitted in triplicate. If at all possible, manuscripts should be accompanied by a disk (3 1/2" or 5 1/4") containing a word-processing file of the manuscript. We support most word-processing applications in DOS, Windows, and Macintosh formats. Please include file name, software name and version number on the disk; a hard copy printout is still required. Send manuscripts to the Editor at Department of Natural Sciences, Loma Linda University, Loma Linda, CA 92350. Shorter articles, research updates, letters, and announcements may also be submitted to the editor via e-mail (send to WHAYES@CCMAIL.LLU.EDU). For any contribution, please include your name, address and phone number.

Authors of one page or more of print are entitled to three copies of the issue in which their article appears. Reprints may be purchased upon request to the editor.

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We advertise only non-living products (except feeder insects). All products have been examined and been found to be high quality and fairly priced. Contact I.I.S., PO Box 430671, Big Pine Key, FL 33043, for more information.

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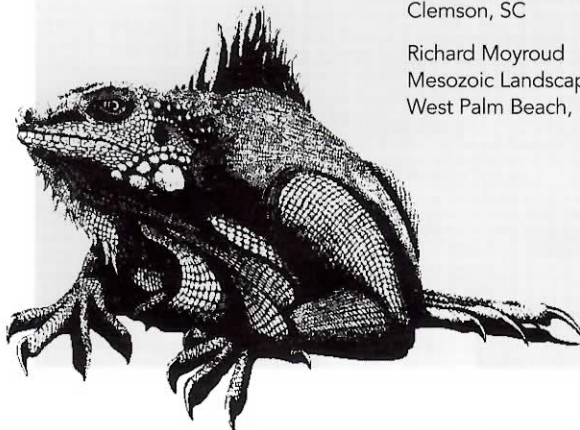
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*San Salvador iguana, Cyclura niveivittata,
San Salvador Island, Bahamas.
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